REMARKS/ARGUMENTS

Applicants note that in view of the Election of Species filed via facsimile on February 3, 2003, claims 10-11 and 22-23 have been withdrawn from consideration in the present application, rather than claims 10-11 and 23-24 as indicated in the Office Action Summary.

Independent claims 1 and 13 have been amended for greater clarity.

Claims 25-28 have been canceled.

Upon entry of this amendment, claims 1-9, 12-21 and 24 will be pending in the present application.

Tables appearing in the specification at pages 14-17 have been replaced with tables reformatted for greater clarity. In the table beginning at page 16, line 13, the obvious typographical error in the final towel weight in the second row of data has been changed from 2.9039 to 2.903g. No new matter has been introduced by these amendments.

Claims 1-3, 8, 9 and 12

Reconsideration is respectfully requested of the rejection of claims 1-3, 8-9, 12 and 25-28 under 35 U.S.C. 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as obvious in view of U.S. Patent No. 6,162,329 (Vinson et al.). Applicants submit that the invention defined in the pending claims is both novel and patentable over Vinson et al.

It has been observed that a strong, unpleasant odor is sometimes emitted from finished paper hand towels and other cellulosic paper products when the towels are wetted (i.e., re-wetted after final drying of the base sheet from which the towel is made). Malodor release upon re-wetting is particularly problematic in paper products made from cellulosic base sheets that have been through-air dried at relatively high air

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temperatures. This phenomenon is perhaps due to the highly oxidative environment and unique mass transfer phenomena provided by the heated air stream passing through the wet-laid web of papermaking fibers. By operating the through-air drying stage of a base sheet manufacturing process at a lower air temperature and compensating with slightly longer sheet residence time on the drying drum, the malodor problem can be largely eliminated. However, longer residence times in the through-drying apparatus adversely affect the overall productivity of the base sheet manufacturing process.

In accordance with the present invention, applicants have discovered that topically applying a glycol compound such as polyethylene glycol to a partially dewatered web of papermaking fibers used to manufacture a cellulosic paper product reduces the generation of malodors once the dried paper product is re-wetted during use. These wet-laid webs containing a topically applied glycol compound can advantageously be through-air dried at higher drying gas temperatures and shortened dryer residence times with concomitant improvement in process throughput and productivity, while significantly reducing malodor produced upon re-wetting the dried base sheets or finished cellulosic paper products made from the base sheets.

Independent claim 1 is directed to a process for manufacturing a cellulosic paper product and requires forming an aqueous suspension of papermaking fibers; depositing the aqueous suspension of papermaking fibers onto a sheet-forming fabric to form a wet web; dewatering the wet web to form a partially dewatered web; topically applying a glycol compound selected from a group consisting of polyethylene glycol, triethylene glycol, glycerol and mixtures thereof to the partially dewatered web having a fiber consistency of about 80% or less; and drying the

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partially dewatered web by passing heated air at a temperature of at least about 175°C through the web.

Vinson et al. disclose a softening composition for absorbent tissues. The composition contains a softening active ingredient, a vehicle in which the softening active ingredient is dispersed and an electrolyte dissolved in the vehicle. The softening active ingredient is suitably a quaternary ammonium compound which is preferably accompanied by an appropriate plasticizer including, for example, glycerol and polyethylene glycols having a molecular weight of from about 200 to about 2000, with polyethylene glycol (PEG) having a molecular weight of from about 200 to about 600 being particularly preferred. The function of the plasticizer is to reduce the melting point and viscosity of the quaternary ammonium ingredient to aid in the synthesis (See col. 13, lines 19-42). The disclosed softening composition including a plasticizer may be applied to a "dry" tissue web, including "overdried" tissue webs, or to a "semi-dry" tissue web (See col. 4, lines 56-58).[1] In a preferred embodiment, the softening composition is applied to a dried or overdried tissue web shortly after it is separated from the drying means and before it is wound onto a parent roll (See col. 5, lines 48-51; col. 18, lines 24-33; and Fig. 1). Alternatively, the softening composition may be applied to a semi-dry tissue web such as while

[1] Contrary to the assertion on page 3 of the Office action, the disclosure at col. 8, lines 65-68 of Vinson et al. does not refer to the addition of the softening composition including a plasticizer to the partially dewatered or embryonic web. Instead, this passage refers to adding to the aqueous papermaking furnish or the embryonic web optional "chemical additives" described in the immediately succeeding paragraphs such as cationic biasing species, resins, surfactants, fillers and chemical softening agents distinguished from the softening composition in that they do not include a plasticizer.

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the web is on the forming wire or Fourdrinier cloth, on a drying felt or fabric, or while the web is in contact with the Yankee dryer or other alternative drying means (See col. 5, lines 51-55). Vinson et al. define a **"dry" or "overdried"** tissue web as a web dried to a moisture content at or below its equilibrium moisture content at standard conditions of 23°C and 50% relative humidity (See col. 4, lines 59-63; and col. 5, lines 22-26). A **"semi-dry"** tissue web includes a web with a moisture content exceeding its equilibrium moisture content (See col. 4, lines 63-65). The equilibrium moisture content of a tissue web at standard conditions is said to be approximately 7% (See col. 5, lines 26-28). The tissue web of Vinson et al. may be dried or overdried using a Yankee dryer or by through-air drying (See col. 5, lines 28-35).

Vinson et al. fail to disclose features recited in the process defined in claim 1. While the cited reference may disclose inclusion of polyethylene glycol or glycerol as a polyhydroxy component of a quaternary ammonium softening composition applied to a tissue web, the reference fails to disclose applying such a polyhydroxy compound to a partially dewatered web **having a fiber consistency of about 80% or less.** Instead, as noted above, Vinson et al. prefer to apply the softening composition to a dry or overdried web defined as having a moisture content of 7% or less and **corresponding to a fiber consistency of 93% or greater.** In each of the Examples, the softening composition containing PEG 400 was applied to the web after the fiber consistency was increased to at least 96% on a Yankee dryer (See Example 1 at col. 21, line 64 to col. 22, line 12; Example 2 at col. 23, line 65 to col. 24, line 9; and Example 3 at col. 25, line 62 to col. 26, line 11). Furthermore, although Vinson et al. disclose that the softening composition may be applied to a semi-dry web, a semi-dry web is defined as

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having a moisture content in excess of 7% (i.e., its equilibrium moisture content at standard conditions) and **corresponding to a fiber consistency of up to 93%.** The remainder of the disclosure, including the working Examples, does not illustrate application of the softening composition to a semi-dry web, nor more importantly, application of the softening composition to a partially dewatered web of papermaking fibers having a fiber consistency of about 80% or less as required in claim 1.

Vinson et al. also fail to disclose the requirement of claim 1 of drying the partially dewatered web of papermaking fibers by passing heated air at a temperature of at least 175°C through the web. While drying the tissue web by through-air drying is mentioned, the reference does not disclose any details as to how such a through-air drying step is conducted, including the temperature of the heated air passed through the web. The only drying temperatures disclosed by Vinson et al. are in Examples 1-3 and **are for a Yankee dryer.** A Yankee dryer is distinguished from through-air drying as it does not involve passing heated air through the web, but instead heats the web as it passes over a steam-heated cylinder. Accordingly, the Examiner's attempted reliance on inherency is misplaced. The disclosure of the operating temperature of a Yankee dryer, which does not involve passing a heated gas through the web, cannot render inherent the air temperature of a through-air drying step.

In view of the above, applicants respectfully submit that the disclosure in Vinson et al. does not anticipate the invention defined in independent claim 1 and the claims depending therefrom.

In order to establish a *prima facie* case of obviousness, the Patent Office must establish, among other things, that there is some teaching, suggestion or incentive to modify the reference or to combine reference teachings. The Patent Office must also

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establish that the reference, or references when combined, teach or suggest all of the claim limitations.

As discussed above, Vinson et al. fail to disclose applying a glycol compound to a partially dewatered web having a fiber consistency of about 80% or less and also fail to teach drying a partially dewatered web of papermaking fibers by passing heated air at a temperature of at least 175°C through the web as required in claim 1. Nothing in the disclosure of Vinson et al. would have motivated one skilled in the art to apply the softening composition disclosed therein to a partially dewatered web having a fiber consistency of about 80% or less. Vinson et al.'s preferred practice is clearly to apply the softening composition to a dry or overdried web having a fiber consistency of 93% or greater. In each of the Examples, the softening composition containing PEG 400 was applied to the web after the fiber consistency was increased to at least 96%. Significantly, the optional chemical softening agents disclosed by Vinson et al. as being added to the "wet end" of the papermaking process do not include the viscosity reducing plasticizer (See col. 10, lines 14-31). Accordingly, if anything, one skilled in the art would have been dissuaded from applying the softening composition including the plasticizer to a web having a fiber consistency appreciably less than about 93%.

Vinson et al. do not teach or suggest the benefits achieved by the combination of applying a glycol compound to the partially dewatered web **and** conducting a through-air drying operation at air temperatures of at least about 175°C. The present invention provides for shorter dryer residence times and increased productivity by allowing operation of the through-drying step at these elevated temperatures, while significantly reducing malodor produced upon re-wetting the dried base sheets or finished cellulosic paper products made from the base sheets. The use of

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a polyhydroxy compound in the softening composition of the cited reference is to serve as a viscosity reducer and has nothing to do with reducing malodors generated upon re-wetting of a paper product through-air dried at elevated temperatures. Accordingly, one skilled in the art upon reading Vinson et al. would have no basis to realize that the inclusion of a glycol compound in the softening composition would inhibit the production of malodors and allow for through-air drying at temperatures of at least about 175°C. Vinson et al. do not disclose the air temperatures to employ in a through-air drying operation. The Office has referred to the Yankee dryer operating temperature of 350°F (177°C) disclosed in Example 3 at col. 26, lines 1-3. However, in Example 2 of Vinson et al., the Yankee dryer was operated at a temperature of only 315°F (157°C) (See col. 24, line 3). Applicants are uncertain as to whether these operating temperatures refer to the temperature of the drying surface of the Yankee dryer or perhaps to the temperature of the steam used to heat the surface. In any event, the reference does not attribute any significance to using elevated drying temperatures generally. In the absence of any suggestion that inclusion of a glycol compound inhibits malodor production and permits higher through-air drying temperatures of at least about 175°C, it is just as likely that a person skilled in the art upon reading Vinson et al. would follow the teaching of Example 2 and employ a drying temperature of 157°C, well below the requisite temperature of 175°C. Nothing in the disclosure of Vinson et al. would have motivated one skilled in the art to select a through-air drying temperature of at least about 175°C.

In view of the above, applicants respectfully submit that the invention defined in independent claim 1 and claims 2, 3, 8, 9 and 12 depending therefrom are patentable over Vinson et al.

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Claims 4, 5, 13-16 and 24

Reconsideration is respectfully requested of the rejection of claims 4, 5, 13-16 and 24 under 35 U.S.C. §103(a) based on the disclosure of Vinson et al. in view of WO 01/18310 (Kohler et al.).

Independent claim 13 is directed to a process for manufacturing a cellulosic paper product and requires forming an aqueous suspension of papermaking fibers; depositing the aqueous suspension of papermaking fibers onto a sheet-forming fabric to form a wet web; dewatering the wet web to produce a partially dewatered web having a fiber consistency of about 80% or less; topically applying a glycol compound selected from the group consisting of polyethylene glycol, triethylene glycol, glycerol and mixtures thereof to the partially dewatered web; and drying the partially dewatered web. Unlike claim 1, claim 13 does not require through-air drying by passing heated air at a temperature of at least about 175°C through the web. However, claim 13 includes the further limitation that the glycol compound be applied to the partially dewatered web in an add-on amount ranging from about 0.5% to about 20% by weight of papermaking fibers in the web.

The disclosure of Vinson et al. is discussed above.

Kohler et al. disclose a process for improving the surface characteristics (e.g., strength, brightness and aging resistance) of a paper or board by applying an aqueous solution (L_w) of a surface-finishing active ingredient (W) to a hydrophilic paper or board sheet. The surface-finishing active ingredient includes polyethylene glycol (W_1) having an average molecular weight greater than 1500 present in the solution at a concentration of up to 50% by weight, preferably from 0.1 to 20% by weight. The aqueous solution of polyethylene glycol is applied by spraying the aqueous solution onto the surface of the paper or board sheet

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to be treated in a section of the papermaking process in which the paper or board sheet has a moisture content ≤ 40%, corresponding to a fiber consistency of ≥ 60% (See page 13, lines 12-15). In all of the Examples, Solutions 1-7 containing polyethylene glycol were applied to dry paper. Preferably, the application rate of the solution is such that the concentration of the polyethylene glycol based on the dry substrate is in the range of from 0.005 g/m^2 to 5 g/m^2.

Contrary to the assertion in the Office action, Kohler et al. fail to teach the addition of polyethylene glycol to a partially dewatered web in an add-on amount ranging from about 0.5% to about 20% by weight of papermaking fibers in the web as required in claim 13. On page 4 of the Office action, the Examiner states that Kohler et al. disclose adding polyethylene glycol in amounts ranging from about 0.3% (referring to Example 2 at page 21 of Kohler et al.) to about 14% (referring to Example 1 at page 19 of Kohler et al.). The 0.3% polyethylene glycol added in Example 2 relied on by the Examiner is based on the weight of fiber material (See page 21, line 8-9), the same basis used in claim 13. However, the upper end of the range of 14% from Example 1 relied on by the Examiner is clearly described as the moistening of the paper as a result of spraying the aqueous solution (Solution I) containing polyethylene glycol **and water** (See page 19, line 18), and not the amount of polyethylene glycol alone. At page 20, line 2, Kohler et al. teach that the moistening of 14% relied on by the Examiner corresponds to an application of polyethylene glycol of **0.2%** by weight based on the fiber material. This correspondence is calculated by multiplying the application rate of Solution I (1.12 g/m^2) by the weight concentration of polyethylene glycol in Solution I (10%) and dividing by the basis weight of the paper (56 g/m^2). Similarly, none of the remaining Examples 3-8 discloses addition of

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polyethylene glycol in an amount greater than 0.3% by weight based on the fiber material. For example, Example 8 includes polyethylene glycol addition of 0.15% by weight of fiber material. (See page 25, lines 3-4). Example 9 does not disclose the addition of polyethylene glycol in terms of the fiber material and fails to disclose information sufficient to make such a calculation. Thus, Kohler et al. fail to teach or suggest limitations of claim 13, including topically applying a glycol compound to a partially dewatered web having a fiber consistency of about 80% or less and applying the glycol compound in an add-on amount of from about 0.5% to about 20% by weight of the papermaking fibers in the web.

Given the deficiencies of Vinson et al. with respect to the invention of claim 13, including the requirement of applying a glycol compound to a partially dewatered web having a fiber consistency of about 80% or less, and the above-noted shortcomings of the teaching of Kohler et al., applicants respectfully submit that these references, either singly or when combined, do not teach or suggest each of the limitations recited in claim 13. Furthermore, the asserted justification for combining Vinson et al. with Kohler et al. to "expand the application of polyethylene glycol as a softener in the design of Vinson" misconstrues both references. Vinson et al. do not teach the use of polyethylene glycol as a softener, but as a plasticizer used only in conjunction with a quaternary ammonium softening active ingredient to reduce the melting point and viscosity of the quaternary ammonium ingredient to aid in the synthesis. By contrast Kohler et al. do not teach the use of quaternary ammonium softening agent and instead use polyethylene glycol as a component of a surface-finishing composition. Thus, the disparate uses of polyethylene glycol in these two references would not suggest one skilled in the art to combine their

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teachings. In view of the above, applicants respectfully submit that a *prima facie* case of obviousness is lacking with respect to claim 13. Claims 14-16 and 24 depend from claim 13 and likewise are submitted as patentable over Vinson et al in view of Kohler et al.

Claims 4 and 5 depend indirectly from claim 1 and further require that the glycol compound comprising polyethylene glycol having a molecular weight of approximately 600 be topically applied to the partially dewatered web in an add-on amount of about 0.5 to about 20% by weight of the papermaking fibers in the partially dewatered web, more preferably in an add-on amount of about 1 to about 2% by weight of the papermaking fibers in the partially dewatered web.

The process defined in dependent claims 4 and 5 is distinguished from the disclosure in Vinson et al. for the reasons set forth above with respect to claim 1. Furthermore, as noted above with respect to claim 13, Kohler et al. fail to disclose the range of polyethylene glycol addition recited in claims 4 and 5. Accordingly, applicants respectfully submit that claims 4 and 5 are patentable over Vinson et al in view of Kohler et al.

Claims 6 and 7

Reconsideration is respectfully requested of the rejection of claims 6 and 7 as being obvious over Vinson et al. in view of U.S. Patent No. 3,779,791 (Ploetz et al.).

Claims 6 and 7 depend indirectly from claim 1 and further require that the temperature of heated air passed through the partially dewatered web during the through-air drying step be from about 190°C to about 210°C or from about 200°C to about 205°C.

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Ploetz et al. disclose a method that permits heating of **paper products** consisting predominantly or entirely of cellulose (e.g., paper and paperboard) to temperatures well in excess of 100°C, as during dry sterilization, without the paper product becoming brittle or disintegrating. The method includes impregnating the paper product with from 2% to 25% by weight polyethylene glycol prior to heating.

Applicants respectfully point out that the disclosure of Ploetz et al. is limited solely to heat treatment of existing paper products and that the reference makes absolutely no mention of the temperatures at which partially dewatered webs of papermaking fibers are dried during the initial papermaking process, much less through-air drying temperatures. Accordingly, the acknowledged deficiencies of the disclosure in Vinson et al. with respect to the temperature of the air passed through the partially dewatered web as recited in claims 6 and 7 cannot be overcome by resort to Ploetz et al.

In view of the above, applicants respectfully submit that claims 6 and 7 are patentable over Vinson et al. in view of Ploetz et al.

Claims 17-21

Reconsideration is respectfully requested of the rejection of claims 17-21 as being obvious over Vinson et al. in view of Kohler et al. and further in view of Ploetz et al.

Claims 17-19 depend indirectly from claim 13 and further require that the partially dewatered web be through-air dried by passing heated air at a temperature of at least about 190°C, from about 190°C to about 210°C or from about 200°C to about 205°C through the web.

The references are discussed above. Kohler et al. do not mention through-air drying. Ploetz et al. disclose nothing

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regarding drying partially dewatered webs during the papermaking process. Accordingly, the admitted deficiencies in the disclosure of Vinson et al. with respect to claims 17-19 cannot be overcome by resort to the secondary references.

Claims 20 and 21 depend indirectly from claim 13 and are submitted as patentable over the combination of Vinson et al., Kohler et al. and Ploetz et al. for the reasons set forth above with respect to claim 13.

Conclusion

Favorable reconsideration and allowance of all pending claims are respectfully solicited.

The Commissioner is requested to charge any fee deficiency in connection with this amendment to Deposit Account No. 19-1345.

Respectfully submitted,

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